

Peer Review Charge for EPA's 2007 Report on the Environment: *Highlights of Conditions and Trends*

The U.S. Environmental Protection Agency (EPA) has asked independent peer reviewers to critically review *EPA's 2007 Report on the Environment Highlights of Conditions and Trends* (Highlights Document or HD). Reviewers are asked to evaluate if the HD is an appropriate distillation of *EPA's 2007 Report on the Environment Technical Document* (Technical Document or TD) and if the HD is presented effectively for the target audience.

The purpose of the Highlights Document is to present national status and trends in the environment and human health in a clear, engaging manner to a public audience of "civic-minded individuals." The HD should inform the audience about important environmental issues, make the information meaningful to them, and provide a means for the audience to access more in-depth information.

The Agency's approach to these issues was informed by the overall purpose of the Report on the Environment (ROE), the nature of the TD as its source document, and by feedback on an earlier publication, the *Draft Report on the Environment Public Document 2003* (PD03).

Using the guidance in **Section 1** and the more detailed background information in **Section 2** (pp. 2-5), please address the three peer review charge questions. Please become familiar with the HD's scope and layout so you can adequately address charge question 2.

Section 1: Charge Questions and Review Materials

The draft Highlights Document is being reviewed for content in the following important areas:

- Scientific accuracy and alignment with the Technical Document.
- Presentation to the target audience.

The following materials are provided:

Review Document

- Draft Highlights Document

Background Materials

- ROE07 Technical Document.
- Attachment A to the Charge: ROE07 Indicator Definition and Criteria.
- Attachment B to the Charge: ROE07 Questions and Supporting Indicators.

The first charge question is directed to SAB reviewers who are also reviewing the Technical Document. Questions 2 and 3 are to be answered by all reviewers. Considering the background

information provided in Section 2 below, please read the review document and respond to the following questions:

SAB reviewers:

1. Does the Highlights Document accurately represent the scientific content of the Technical Document? Are key areas over- or under-represented? Would someone familiar with both documents come to the same conclusions regarding human health and the state of the nation's environment?

All reviewers:

2. The Highlights Document distills the information found in the Technical Document. Is the Highlights Document scientifically accurate? What conclusions would one come to regarding human health and the state of the nation's environment?

3. Is the information in the Highlights Document presented in a way that is understandable to the target audience? Are the structure and length of the Highlights Document appropriate for its content and the target audience? How could the presentation be improved?

Section 2: Background

Purpose of EPA's 2007 Report on the Environment

EPA's *Report on the Environment 2007* (ROE07) consists of three products:

1. A Technical Document written for environmental professionals. This document forms the scientific basis of all three products.
2. A Highlights Document written for civic-minded individuals.
3. An electronic Report on the Environment that facilitates access to the data and their sources.

The purpose of ROE07 is to answer questions that the Agency believes best reflect its mission to protect human health and the environment. To the extent possible, this is accomplished using a suite of indicators that have been subjected to rigorous peer review. The ROE07 summarizes and communicates what is known and not known about the current status and trends in the condition of air, water, land, human health, and ecological systems in the nation. EPA intends to use this information to inform its strategic planning and decision-making.

A fundamental premise of the ROE is that it uses only peer-reviewed indicators to answer the questions. Though many other environmental data sources, publications, and site-specific research projects are available, the ROE intentionally uses only indicators that rely on physical, chemical, and biological measurements to monitor trends in condition over time.

Further, the 2007 ROE focuses on national-level indicators. National indicators address ROE questions at national as opposed to regional or local scales and thus provide a broad and relatively coarse picture of condition.

ROE Review

In 2003, EPA released its first ROE, the *Draft Report on the Environment 2003* (DROE03), which consisted of a Public Document (PD03) and a Technical Document. Both documents were reviewed by EPA's Science Advisory Board and national "dialog sessions" were held in six cities to receive comments on the report's utility and to obtain feedback on how to improve future reports. EPA then developed the updated Technical Document and Highlights Document currently under review.

The indicators in the 2007 ROE Technical Document were reviewed by external scientists in 2005 and the entire draft TD will be reviewed by EPA's Science Advisory Board. In addition, drafts of the 2007 ROE Highlights Document were reviewed by EPA and by other federal agencies. The HD has incorporated the results of these reviews to create the present document.

Development of the ROE07 Technical Document

Questions. A series of 23 important questions concerning trends in the condition of the environment and human health have been developed and form the structural basis of the report. The questions focus not only on EPA's current regulatory and program activities, but also on issues clearly related to EPA's mission to protect human health and the environment. The questions should be answered as fully as possible if EPA is to be adequately informed about important environmental trends. However, it is recognized that the questions cannot be answered completely based on the available data.

Indicators. The questions are answered using indicators that meet an explicit definition and a set of criteria (see Attachment A). These indicators come from a number of sources, including the DROE03, EPA, other federal agencies, and non-profit organizations. All proposed indicators were screened for their ability to pass a peer review based on the indicator definition and criteria. Based on the peer reviewer recommendations, some indicators were dropped from further consideration and others were revised for inclusion in the Technical Document. The final set of indicators is listed in Attachment B.

Other Elements of the TD. The questions and their associated indicators are presented in five main chapters of the TD; Air, Water, Land, Human Health, and Ecological Condition. The text for each question describes the scope of the question, presents the indicators used to answer the question, and summarizes the "answer" that the available indicators provide to the question, along with limitations and gaps (i.e., where no indicators meeting the criteria are currently available to answer important aspects of the question). The TD also includes an introduction and several appendices.

Development of the Highlights Document

In developing the HD, EPA has benefited from feedback from several groups, including EPA's Science Advisory Board, the National Advisory Council for Environmental Policy and Technology, the Local Government Advisory Committee, and a series of national dialog sessions in 2003 and 2004.

Audience

The target audience for the 2007 Highlights Document is "civic-minded individuals," which is a subset of the population that has some interest and knowledge of the environment and is likely to seek environmental information. Civic-minded individuals include members of civic or community groups, members of environmental groups, parents, students, educators, and local decision-makers. In addition, there are secondary audiences for the HD who are not environmental or health professionals, but are likely to use the HD rather than the TD for professional purposes. Examples of these audiences include the media, policymakers, industry, and real estate professionals.

This target audience is deliberately narrower than the PD03 target audience of the "educated layperson." This change was made in response to feedback which encouraged EPA to design the HD for a more tailored audience and to make the HD considerably shorter than the PD03. By targeting the civic-minded individual, the HD is likely to appeal to the individuals it is most likely to reach, rather than a broad general public audience, most of whom have limited interest in the material. In other words, the HD is targeted to those who will read it, rather than those who will not. If the HD targeted a broader audience, the informed readers would need to wade through long explanations of basic concepts before reaching the information they seek, and assume that the HD is not for them.

Purpose

EPA received comments from multiple venues indicating that the HD would be more effective if its purpose was defined more precisely. Reviewers suggested that without certain revisions in the Highlights Document, EPA would miss an opportunity to engage and educate Americans on the state of the environment. Based on this feedback and considering the needs of the target audience, EPA proposed three purposes for the Highlights Document:

1. Describe the highlights in conditions and trends in the environment and human health.
2. Inform the audience about important environmental issues and make the information meaningful to them.
3. Provide a means for the audience to delve deeper into environmental indicators and information.

The first purpose is central to the ROE as a whole and includes the key point, as does the TD, that EPA's ability to describe conditions and trends in many areas is limited by incomplete information. The second purpose for the HD is to inform the public about important environmental issues and increase the level of environmental literacy. The third purpose is to

provide a means for the audience to learn more about indicators and environmental and health issues. Given the goal of creating a shorter HD, the document could not provide details about any single topic. However, it should whet readers' appetites and direct them to more detailed information in the 2007 TD and the e-ROE.

Length

The PD03 was 160 pages long. Groups and individuals commenting on the PD03 clearly recommended that the next version be much shorter. The ROE07 TD presents indicators to address the 23 questions and is organized into five chapters (see Attachment B). The HD is similarly organized, with one exception. The Outdoor Air question of the TD was divided into three parts in the HD (Outdoor Air, Acid Rain and Regional Haze, and Ozone Depletion) because in the TD this question includes more than 25 indicators. To keep the HD brief, each topic is allocated a single page.

Content

Each page provides background information and summarizes the status and trends based on the available indicators, while also acknowledging indicator gaps and limitations. Each page also includes a graphic to illustrate one of the indicators.

A basic premise of the ROE07 HD was that its scientific content would be derived entirely from the Technical Document. In order to distill the large quantity of information in the TD into a short HD, EPA highlighted indicators for each topic using several criteria:

- Scientific importance,
- Importance to civic-minded individuals,
- Degree to which the indicator contributes to answering the ROE question,
- Degree to which there are significant changes in trends in recent years, and
- New indicator.

This information is shown in bulleted form on each topic page.

ATTACHMENT A: ROE07 INDICATOR DEFINITION AND CRITERIA

Indicator Definition

A numerical value derived from actual measurements of a pressure, ambient condition, exposure, or human health or ecological condition over a specified geographic domain, whose trends over time represent or draw attention to underlying trends in the condition of the environment. Indicators and their underlying data must meet criteria (see box below) for data quality, comparability, representativeness, and adequate coverage in time and space. Note that indicators rely on an underlying database or set of databases, but the databases themselves are not indicators.

Indicator Criteria

- 1) The indicator makes an important contribution to answering a question for the ROE. (In this context, “important” means that the indicator answers a substantial portion of and/or a critical part of the question.)
- 2) The indicator is objective. It is developed and presented in an accurate, clear, complete, and unbiased manner.
- 3) The underlying data are characterized by sound collection methodologies, data management systems that protect their integrity, and quality assurance procedures.
- 4) Data are available to describe changes or trends, and the latest available data are timely.
- 5) The data are comparable across time and space, and representative of the target population. Trends depicted in this indicator accurately represent the underlying trends in the target population.
- 6) The indicator is transparent and reproducible. The specific data used and the specific assumptions, analytic methods, and statistical procedures employed are clearly stated.

ATTACHMENT B: ROE07 QUESTIONS AND SUPPORTING INDICATORS

Air

Outdoor Air

What are the trends in outdoor air quality and their effects on human health and the environment?

Carbon Monoxide Emissions; Ambient Concentrations of Carbon Monoxide; Lead Emissions; Ambient Concentrations of Lead; Nitrogen Oxides Emissions; Ambient Concentrations of Nitrogen Dioxide; Volatile Organic Compound Emissions; Ambient Concentrations of Ozone; Ozone Injury to Forest Plants; Particulate Matter Emissions; Ambient Concentrations of Particulate Matter (PM); Sulfur Dioxide Emissions; Percent of Days with Air Quality Index Values > 100 ; Mercury Emissions; Air Toxics Emissions; Ambient Concentrations of Benzene; Ozone and PM Concentrations for U.S. Counties in the U.S./Mexico Border Region; Ambient Concentrations of Manganese Compounds in EPA Region 5

Acid Rain and Regional Haze

What are the trends in outdoor air quality and their effects on human health and the environment?

Nitrogen Oxides Emissions; Regional Haze; Sulfur Dioxide Emissions; Acid Deposition; Lake and Stream Acidity; Particulate Matter Emissions

Ozone Depletion

What are the trends in outdoor air quality and their effects on human health and the environment?

Concentrations of Ozone-Depleting Substances; Ozone Levels over North America

Greenhouse Gases

What are the trends in greenhouse gas emissions and concentrations?

U.S. Greenhouse Gas Emissions; Atmospheric Concentrations of Greenhouse Gases

Indoor Air

What are the trends in indoor air quality and their effects on human health?

U.S. Homes Above EPA's Radon Action Levels; Blood Cotinine Level

Water

Fresh Surface Waters

What are the trends in extent and condition of fresh surface waters and their effects on human health and the environment?

High and Low Stream Flows; Streambed Stability in Wadeable Streams; Nitrogen and Phosphorus in Wadeable Streams; Nitrogen and Phosphorus in Streams in Agricultural Watersheds; Nitrogen and Phosphorus Discharge from Large Rivers; Pesticides in Streams in Agricultural Watersheds; Benthic Macroinvertebrates in Wadeable Streams; Lake and Stream Acidity

Ground Water

What are the trends in extent and condition of ground water and their effects on human health and the environment?

Nitrate and Pesticides in Ground Water in Agricultural Watersheds

Wetlands

What are the trends in extent and condition of wetlands and their effects on human health and the environment?

Wetland Extent, Change, and Sources of Change

Coastal Waters

What are the trends in extent and condition of coastal waters and their effects on human health and the environment?

Coastal Water Quality; Coastal Sediment Quality; Coastal Benthic Communities; Submerged Aquatic Vegetation in Chesapeake Bay; Hypoxia in the Gulf of Mexico and Long Island Sound; Harmful Algal Blooms along the Western Florida Coastline; Coastal Fish Tissue Contaminants; Wetland Extent, Change, and Sources of Change

Drinking Water

What are the trends in the quality of drinking water and their effects on human health?

Population Served by Community Water Systems with No Reported Violations of Health-Based Standards

Recreational Waters

What are the trends in the condition of recreational waters and their effects on human health and the environment?

There are currently no national indicators available for this topic.

Consumable Fish and Shellfish

What are the trends in the condition of consumable fish and shellfish and their effects on human health?

Coastal Fish Tissue Contaminants; Contaminants in Lake Fish Tissue

Land

Land Cover

What are the trends in land cover and their effects on human health and the environment?

Land Cover; Land Cover in the Puget Sound/Georgia Basin; Forest Extent and Type

Land Use

What are the trends in land use and their effects on human health and the environment?

Land Use; Urbanization and Population Change

Wastes and the Environment

What are the trends in wastes and their effects on human health and the environment?

Quantity of Municipal Solid Waste Generated and Managed; Quantity of RCRA Hazardous Waste Generated and Managed

Chemicals Applied and Released to Land

What are the trends in chemicals used on the land and their effects on human health and the environment?

Fertilizer Applied for Agricultural Purposes; Toxic Chemicals in Production-Related Wastes Released, Treated, Recycled, or Recovered for Energy Use; Pesticide Residues in Food; Reported Pesticide Incidents

Contaminated Land

What are the trends in contaminated land and their effects on human health and the environment?

High-Priority Cleanup Sites with No Human Contact to Contamination In Excess of Health-Based Standards; High-Priority Cleanup Sites Where Contaminated Ground Water Is Not Continuing to Spread Above Levels of Concern

Human Health

Health Status

What are the trends in human health status in the United States?

General Mortality; Life Expectancy at Birth; Infant Mortality

Diseases and Health Conditions

What are the trends in human disease and conditions for which environmental pollutants may be a risk factor, including across population subgroups and geographic regions?

Cancer Incidence; Cardiovascular Disease Prevalence and Mortality; Chronic Obstructive Pulmonary Disease Prevalence and Mortality; Asthma Prevalence; Infectious Diseases Associated with Environmental Exposures or Conditions; Childhood Cancer Incidence; Birth Defects Rates and Mortality; Low Birthweight; Preterm Delivery

Exposure to Environmental Contaminants

What are the trends in human exposure to environmental contaminants including across population subgroups and geographic regions?

Blood Lead Level; Blood Mercury Level; Blood Cadmium Level; Blood Cotinine Level; Blood Persistent Organic Pollutants (POPs) Level; Urinary Pesticide Level; Urinary Phthalate Level

Ecological Condition

Patterns in Ecological Systems

What are the trends in the extent and distribution of the nation's ecological systems?

Forest Extent and Type; Forest Fragmentation; Ecological Connectivity in EPA Region 4; Relative Ecological Condition of Undeveloped Land in EPA Region 5; Land Cover; Land Use; Urbanization and Population Change; Wetland Extent, Change, and Sources of Change; Land Cover in the Puget Sound Basin

Biological Diversity

What are the trends in the diversity and biological balance of the nation's ecological systems?

Bird Populations; Fish Faunal Intactness; Non-Indigenous Estuarine Species in Pacific Northwest; Coastal Benthic Communities; Harmful Algal Bloom Outbreaks along the Western

Florida Coastline; Submerged Aquatic Vegetation in Chesapeake Bay; Benthic Macroinvertebrates in Wadeable Streams

Ecological Processes

What are the trends in the ecological processes that sustain the nation's ecological systems?

Carbon Storage in Forests; Ecological Connectivity in EPA Region 4

Physical and Chemical Attributes of Ecological Systems

What are the trends in the critical physical and chemical attributes and processes of the nation's ecological systems?

U.S. and Global Mean Temperature and Precipitation; Sea Surface Temperature; Sea Level; High and Low Stream Flows; Lake and Stream Acidity; Nitrogen and Phosphorus Discharge from Large Rivers; Nitrogen and Phosphorus in Streams in Agricultural Watersheds; Nitrogen and Phosphorus in Wadeable Streams; Streambed Stability in Wadeable Streams; Hypoxia in the Gulf of Mexico and Long Island Sound

Ecological Exposure to Contaminants

What are the trends in biomeasures of exposure to common environmental pollutants in plants and animals?

Coastal Fish Tissue Contaminants; Contaminants in Lake Fish Tissue; Ozone Injury to Forest Plants